

REMARKS/ARGUMENTS

Reconsideration of this application is requested. Claims 1-13 and 15-18 and 20 are in the case.

I. DRAWINGS

Figures 1-3 have been objected to as not showing "Prior Art". In response, attached are replacement sheets where Figures 1-3 are designated by the legend "Prior Art". Entry of the attached corrected drawings is respectfully requested.

II. CLAIM OBJECTIONS

Claims 14 and 19 have been objected to in view of the reference to "KALTEK (RTM) material". In response, and without conceding to the merit of this rejection, claims 14 and 19 have been canceled without prejudice. For the Examiner's information, and the record, attached are technical brochures (7 pages) relating to KALTEK.

Claim 18 has been objected to as allegedly of improper dependent. This objection is not understood. It is not seen how specifying the liner is discardable renders the claim of improper form. With regard to "readily separable", claim 18 has been amended to delete "readily". Withdrawal of the objections to the claims is now respectfully requested.

III. THE OBVIOUSNESS REJECTION

Claims 1-19 stand rejected under 35 U.S.C. §103(a) as allegedly unpatentable over prior art described in the present application. This rejection is respectfully traversed.

As claimed, the present invention is directed to a liner for a ladle and a ladle containing the liner. The liner comprises a body of refractory material defining a hollow interior, the body having a continuous sidewall bounding the hollow interior, a lower closure floor and an open top. A barrier of refractory material faces an interior surface of part of the sidewall and is spaced inwardly therefrom in the hollow interior. The barrier extends from at or near the open top of the body towards the lower closure floor to define, with the facing part of the sidewall, a spout for discharging molten metal, in use, from the interior of the ladle. The barrier has two longitudinal edge surfaces. Two facing inner portions of the sidewall are extended inwardly, and the longitudinal edge surfaces of the barrier are received at the inwardly extended portions respectively, thereby positioning the barrier at the inward spacing from, and facing, the interior surface of part of the sidewall.

The invention has a number of distinct features and benefits, including two facing inner portions of the sidewall extending inwardly and a barrier received at the inwardly extended inner portions of sidewall. Moreover, as noted in the first complete paragraph on page 6 of the application, as there is no outward extension of the spout structure from the body, the liner of the invention can fit into existing ladle without modification. This is illustrated clearly in Figure 6 of the application where it can be seen that the spout region 27 does not extend radially beyond the overall external circumference of

the liner. As a result, the liner can easily be accommodated in a circular or truncated cone-shaped ladle without modification. New dependent claim 20 is directed to this feature. Basis appears in the first complete paragraph of page 6 and in Figure 6. No new matter is entered.

The Examiner asserts that the prior art shows all of the claimed features except the "specifically recited ladle configuration" (inwardly extending portions to meet the edges of the barrier whereas the prior art has the barrier inserted in the continuous sidewall). However, the feature of the inwardly extending portions to meet the edges of the barrier is an important aspect of the present invention and materially affects the function of the ladle of the invention.

As noted above, an important benefit from the new design is the fact that there is no outward extension from the body beyond the overall external circumference of the liner and, as a result, the liner can fit existing ladles of various configurations without the need for costly modifying and rebalancing of the ladle. This satisfies a long-standing problem with such lined ladles. Moreover, the tile (dam plate) used as the barrier is smaller and may be capable of being made of essentially the same material as the liner (e.g., KALTEK TM). Ceramic-refractory tiles are both expensive and they chill the metal, i.e., they are less insulating than the ladle lining material. The present invention allows the use of smaller tiles, which if manufactured in conventional refractory will have reduced cost and reduced chilling effect on the metal. Alternatively, small tiles having sufficient mechanical strength may be made in KALTEK TM type material and these offer the benefits of lower cost and superior insulating properties (less chill) than conventional material. In conventional shaped ladles, if large tiles are used, they are

prone to fracture or they may potentially introduce unwanted gas into the metal.

US patent 4,330,107 (Lynham) is acknowledged at 3 of the application and describes a teapot ladle which is illustrated in Figure 1 of the present application. The ladle as a flat tile embedded in the sidewalls, as shown in Figure 3 of Lynham. There is no disclosure or suggestion of inwardly extending sidewalls to fix the barrier. Making the tile of the same material as the liner (KALTEK TM) would be impractical because it does not last long in use and is prone to produce gas defects in the metal. Making the tile from a conventional refractory/ceramic material would be both costly and cause a chill effect on the metal. In light of this, lone of ordinary skill would not have been motivated to arrive at the present invention based on Lynham.

US patent 4,391,636 (Windish) listed on the PTO-892 is a specifically designed ladle for the in-ladle treatment of molten metal (iron). The ladle liner is a cast-in-place refractory liner that forms various compartments or chambers and passages. There is no separate, fixed barrier to form a spout for pouring, or inwardly extending sidewalls. The ladle is in fact two distinct, interconnected chambers, and the separating wall would either possess insufficient insulating properties (and would chill the metal) or, if made out of a KALTEK type material, would potentially produce too much gas. The presently claimed invention is clearly neither disclosed nor suggested by Windish.

EP071363 (English) (not "Frank" as indicated on the PTO-892) has the spout formed by a refractory tube attached to the sidewall of a liner. There is no barrier facing the pouring lip (to form a spout), and there are no inwardly extending walls of the liner to fix the barrier, simply a flattened sidewall. Being a specifically designed complex shape, the English article will be expensive to make and fit and, due to its relative size, it will

have a notable chilling effect on the metal. Based on the English configuration, it would not be possible to manufacture an appropriate article in a KALTEK-type material and, even if it was, it would likely produce too much gas during use.

US patent 1,344,688 (Griner), listed on the PTO-892, does not have inwardly extending sidewalls to fix a barrier. Griner is similar in design to US patent 4,330,107 to Lynham in that a barrier extends across the ladle and is embedded in the walls of the ladle liner. Griner does not suggest the presently claimed invention for the same reasons as discussed above in regard to Lynham.

Figures 2 and 3 of the present application likewise do not suggest the presently claimed invention. In Figure 2, the barrier is embedded within grooves in the sidewalls, and there is no suggestion of inwardly extending sidewalls of the liner to secure the barrier. Figure 3 shows a barrier made from refractory or ceramic tile, but the spout is formed by curving the sidewall of the liner outwards beyond the external circumference of the liner and extending the extension downward by the whole length of the liner, which would mean that the ladle liner could not simply fit into any shape of ladle, i.e., the ladle would need to be modified to fit the liner or the liner designed/modified for each different ladle.

In light of the above, it is clear that one of ordinary skill would not have been motivated to arrive at the presently claimed invention based on the prior art discussed in the present application. Absent any such motivation, it is clear that a *prima facie* case of obviousness has not been generated in this case. Reconsideration and withdrawal of the outstanding obviousness rejection are accordingly respectfully requested.

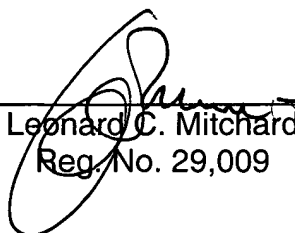
CAROLLA et al
Appl. No. 10/803,891
September 9, 2005

Favorable action on this application is awaited.

Respectfully submitted,

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By: _____


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Attachment: KALTEK brochures (7 pages)

AMENDMENTS TO THE DRAWINGS

The attached sheets of drawings include amended Figs. 1-3. These sheets, which include Figs. 1-8, replaces the original sheet including Figs. 1-8. Figures 1-3 are labeled as "Prior Art".

Attachment: Replacement Sheets
Annotated Sheet Showing Changes